

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended): A frequency channel assignment system comprising a plurality of radio communications systems which use a common frequency band in a common geographical area, and a controller, the controller comprising:

a system characteristics information management function configured to manage system characteristics information showing characteristics of frequency channels in the radio communications systems, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel; [[and]]

a frequency channel assignment function configured to assign the frequency channels to each of the radio communications systems, based on the system characteristics information and channel status information showing status of the frequency channels, so as to avoid inter-system interference, the channel status information including, for each frequency channel, an interference measurement of the frequency channel;

the controller determining, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications system; and

the frequency channel assignment function, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizes a frequency channel

of a low frequency band in the first radio communication system and prioritizes a frequency channel of a high frequency band in the second radio communication system.

2. (Currently Amended): The frequency channel assignment system as set forth in claim 1, the controller further comprising:

a required frequency channel calculation function configured to calculate the number of frequency channels required at a base station, based on at least one of call loss probability and traffic at the base station, wherein

the frequency channel assignment function is configured to assign the frequency channels to each of the radio communications systems, based on the system characteristics information, the channel status information, and the required number of frequency channels, so as to avoid inter-system interference.

3. (Previously Presented): The frequency channel assignment system as set forth in claim 2, the controller further comprising:

a control apparatus provided in each of the plurality of radio communications systems, and an inter-system common control apparatus connected to the plurality of radio communications systems,

the control apparatus comprising:

a function of collecting the channel status information;

a function of calculating the required number of frequency channels; and

a notification function configured to notify the required number of frequency channels and the channel status information to the inter-system common control apparatus;  
and

the inter-system common control apparatus comprising:

a function of managing the system characteristics information;  
a function of assigning the frequency channels; and  
a frequency channel notification function configured to notify the assigned frequency channels to each of the control apparatuses.

4. (Original): The frequency channel assignment system as set forth in claim 3, wherein the inter-system common control apparatus is provided in a control station in a given radio communications system of the plurality of radio communications systems.

5. (Currently Amended): The frequency channel assignment system as set forth in Claim 1, wherein, as the system characteristics information, at least one of overlapping use possibility on the frequency channels, priority of assigning the frequency channels, ~~the allowable amount of interference on the frequency channels,~~ and frequency bandwidth used on the frequency channels is used.

6. (Currently Amended): The frequency channel assignment system as set forth in Claim 1, wherein, as the channel status information, at least one of use status of the frequency channels, ~~the amount of interference on the frequency channels,~~ and radio path change on the frequency channels is used.

7. (Currently Amended): A base station for performing radio communication with mobile stations, using frequency channels in radio communications systems in a common frequency band in a common geographical area, comprising:

a channel status information collection function configured to collect channel status information showing status of frequency channels at the base station, the channel status

information including, for each frequency channel, an interference measurement of the frequency channel;

a system characteristics information management function configured to manage system characteristics information showing characteristics of frequency channels in the radio communications systems, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel; and

a frequency channel selection function configured to select frequency channels for use between the base station and the mobile stations, based on the system characteristics information and the channel status information; [[,]]

the base station determining, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the frequency channel selection function, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizes a frequency channel of a low frequency band in the first radio communication system and prioritizes a frequency channel of a high frequency band in the second radio communication system.

8. (Previously Presented) The base station as set forth in claim 7, further comprising:

a measurement function configured to measure at least one of call loss probability and traffic at the base station; and

a required frequency channel number calculation function configured to calculate the number of frequency channels required at the base station, based on at least one of the call loss probability and the traffic at the base station,

wherein the frequency channel selection function is configured to select frequency channels for use between the base station and the mobile stations, based on the system characteristics information, the channel status information, and the required number of frequency channels.

9. (Currently Amended) A control station for controlling a plurality of base stations in radio communications systems using a common frequency band in a common geographical area, comprising:

a channel status information collection function configured to collect channel status information showing status of frequency channels at each of the base stations, the channel status information including, for each frequency channel, an interference measurement of the frequency channel; and

a required frequency channel number calculation function configured to calculate ~~the numbers~~ a number of frequency channels required at the base stations, based on at least one of call loss probability and traffic at the base stations, ~~wherein~~;

the control station is configured to select frequency channels for use between the base stations and mobile stations, based on ~~[[the]]~~ system characteristics information, the channel status information, and the required numbers of frequency channels, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel;

the control station ~~determining~~ determines, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the control station selects frequency channels, when the first occupied use frequency band is lower than the second occupied use frequency band, by prioritizing a frequency channel of a low frequency band in the first radio communication system and prioritizing a frequency channel of a high frequency band in the second radio communication system.

10. (Currently Amended) An inter-system common control apparatus connected to a plurality of radio communications systems using a common frequency band in a common geographical area, comprising:

a system characteristics information management function configured to manage system characteristics information showing characteristics of frequency channels in the radio communications systems, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel;

a collection function configured to collect channel status information showing status of frequency channels at base stations in the radio communications systems, and the numbers of frequency channels required at the base stations, from control stations in the radio communications systems, the channel status information including, for each frequency channel, an interference measurement of the frequency channel;

a frequency channel assignment function configured to assign frequency channels to each of the radio communications systems, based on the managed system characteristics

information, and the channel status information and the required numbers of frequency channels notified from the control stations; [[and]]

a frequency channel communication function configured to notify the assigned frequency channels to the control stations in the radio communications systems; [[,]]

the control apparatus ~~determining~~ determines, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the frequency channel assignment function, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizes a frequency channel of a low frequency band in the first radio communication system and prioritizes a frequency channel of a high frequency band in the second radio communication system.

11. (Original) The inter-system common control apparatus as set forth in claim 10, wherein, for each frequency channel available at the base stations in the radio communications systems, at least one of overlapping use possibility on the frequency channel, priority of assigning the frequency channel, the allowable amount of interference on the frequency channel, and frequency bandwidth used on the frequency channel is managed as the system characteristics information.

12. (Currently Amended) A frequency channel assignment method for assigning frequency channels to be used for radio communication between mobile stations and base stations in a plurality of radio communications systems which use a common frequency band in a common geographical area, the method comprising:

collecting, at a controller, channel status information showing status of frequency channels at each of the base stations, the channel status information including, for each frequency channel, an interference measurement of the frequency channel;

calculating, at the controller, the number of frequency channels required at each of the base stations, based on the collected channel status information;

assigning, at the controller, frequency channels to each of the radio communications systems, based on system characteristics information showing characteristics of frequency channels in the radio communications systems, the channel status information, and the required number of frequency channels, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel;

notifying, at the controller, the assigned frequency channels to the base stations;

[[and]]

performing, at the base stations, radio communication with the mobile stations, using the frequency channels notified from the controller; [[,]]

the assigning including determining, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and



an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the assigning including, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizing a frequency channel of a low frequency band in the first radio communication system and prioritizing a frequency channel of a high frequency band in the second radio communication system.

13. (Currently Amended) A control method at base stations for performing radio communication with mobile stations, using frequency channels in a common frequency band in a common geographical area, in radio communications systems, the method comprising:

collecting, at the base stations, channel status information showing status of frequency channels at the base stations, the channel status information including, for each frequency channel, an interference measurement of the frequency channel;

managing, at the base stations, system characteristics information showing characteristics of frequency channels in the radio communications systems, the system characteristics information including, for each frequency channel, an allowable amount of interference on the frequency channel;

calculating, at the base stations, the numbers of frequency channels required at the base stations, based on at least one of call loss probability and traffic at the base stations;

[[and]]

selecting, at the base stations, frequency channels for use between the base stations or the other base stations and the mobile stations, based on the system characteristics information, the channel status information and the required numbers of frequency channels;

[[,]]

the selecting including determining, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the selecting including, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizing a frequency channel of a low frequency band in the first radio communication system and prioritizing a frequency channel of a high frequency band in the second radio communication system.

14. (Currently Amended) A control method at a control station for controlling a plurality of base stations in radio communications systems using a common frequency band in a common geographic area, the method comprising:

collecting, at the control station, channel status information showing status of frequency channels at the base stations, the channel status information including, for each frequency channel, an interference measurement of the frequency channel;

calculating, at the control station, the numbers of frequency channels required at the base stations, based on at least one of call loss probability and traffic at the base stations;  
[[and]]

selecting, at the control station, frequency channels for use between the base stations and mobile stations, based on the system characteristics information, the channel status information, and the required numbers of frequency channels, the system characteristics

information including, for each frequency channel, an allowable amount of interference on the frequency channel; [[,]]

the selecting including determining, within a range of the common frequency band and based on the system characteristics information and the channel status information:

a first occupied use frequency band which includes first frequency channels available only to a first radio communications system,

a second occupied use frequency band which includes second frequency channels available only to a second radio communications system, and

an overlapping use frequency band which includes third frequency channels available to the first and second radio communications systems; and

the selecting including, when the first occupied use frequency band is lower than the second occupied use frequency band, prioritizing a frequency channel of a low frequency band in the first radio communication system and prioritizing a frequency channel of a high frequency band in the second radio communication system.

Claim 15 (Previously Presented): The system according to Claim 1, wherein

the controller assigns the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

the controller assigns the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 16 (Previously Presented): The system according to Claim 1, wherein

the controller searches as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

the controller assigns the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

the controller searches as to whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

the controller assigns the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 17 (Previously Presented): The base station according to Claim 7, wherein the base station assigns the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

the base station assigns the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 18 (Previously Presented): The base station according to Claim 7, wherein the base station searches as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

the base station assigns the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

the base station searches as to whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

the base station assigns the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 19 (Previously Presented): The control station according to Claim 9, wherein the control station assigns the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

the control station assigns the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 20 (Previously Presented): The control station according to Claim 9, wherein the base station searches as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

the control station assigns the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

the control station searches as to whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

the control station assigns the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 21 (Previously Presented): The inter-system common control apparatus according to Claim 10, wherein

the inter-system common control apparatus assigns the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

the inter-system common control apparatus assigns the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 22 (Previously Presented): The inter-system common control apparatus according to Claim 10, wherein

the inter-system common control apparatus searches as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

the inter-system common control apparatus assigns the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

the inter-system common control apparatus searches as to whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

the inter-system common control apparatus assigns the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 23 (Previously Presented): The method according to Claim 12, further comprising:

assigning the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

assigning the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 24 (Previously Presented): The method according to Claim 12, further comprising:

searching as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

assigning the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

searching to determine whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

assigning the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 25 (Previously Presented): The method according to Claim 13, further comprising:

assigning the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and

assigning the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 26 (Previously Presented): The method according to Claim 13, further comprising:

searching as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

assigning the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

searching to determine whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

assigning the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.

Claim 27 (Previously Presented): The method according to Claim 14, further comprising:

assigning the first frequency channels included in the first occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the first radio communications system, and



assigning the second frequency channels included in the second occupied use frequency band or the third frequency channels included in the overlapping use frequency band to mobile stations included in the second radio communications system.

Claim 28 (Previously Presented): The method according to Claim 14, further comprising:

searching as to whether there is a first unused frequency channel in the first occupied use frequency band when a mobile station performs call processing,

assigning the first unused frequency channel to the mobile station when the first unused frequency channel exists in the first occupied use frequency band,

searching to determine whether there is a third unused frequency channel in the overlapping use frequency band when the first unused frequency channel does not exist in the first occupied use frequency band, and

assigning the third unused frequency channel to the mobile station when the third unused frequency channel exists in the overlapping use frequency band.